



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/802,375	03/09/2001	Nazir Ahmad	CPAC 1002-1US	8400

22470 7590 09/10/2003

HAYNES BEFFEL & WOLFELD LLP  
P O BOX 366  
HALF MOON BAY, CA 94019

EXAMINER

VU, QUANG D

ART UNIT PAPER NUMBER

2811

DATE MAILED: 09/10/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/802,375

Applicant(s)

AHMAD ET AL.

Examiner

Quang D Vu

Art Unit

2811

*W*

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on amendment filed on 05/28/03.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 14-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 14-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

### DETAILED ACTION

The finality of the rejection of the last Office action is withdrawn in view of the present Office action.

#### *Claim Rejections - 35 USC § 112*

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 18-21 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The specification never discloses a first cured adhesive polymer forming a spot situated in a middle region between the bump surface of the chip and the surface of the substrate, there being no first cured adhesive polymer at the contacts as claimed in claim 18.

The specification never discloses a second cured adhesive polymer forming an underfill as claimed in claim 21.

***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 14 and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent No. 5,346,857 to Scharr et al.

Scharr et al. (figure 2) teach a chip (26) having bumps (28) formed thereon and a substrate (21) having interconnect points on a metallization (23) thereon, the bumps (28) forming contacts with the interconnect points, wherein each the contact comprises an interconnection layer situated at an interface between the bump (28) and the interconnect point (metallization layer [23]) in contact therewith, the layer comprising an alloy (a region indicated by line [29]) of the material of the bump (28) and the material of the metallization (23) (see figure 2; column 3, line 54 – column 4, line 16).

Regarding claim 16, Scharr et al. teach the bump (28) material comprises gold and the interconnect points (metallization [23]) comprise Sn, and the alloy (a region indicated by line [29]) at the interface comprises an Au/Sn alloy (see figure 2; column 3, line 54 – column 4, line 16).

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 2811

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 15 and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Scharr et al. in view of US Patent No. 6,326,234 to Nakamura.

The disclosures of Scharr et al. are discussed as applied to claim 14 above.

Scharr et al. differ from the claimed invention by not showing a cured adhesive polymer is situated in a middle region between the bump surface of the chip and the surface of the substrate. However, Nakamura teaches an adhesive polymer (7) is situated in a middle region between the bump surface of the chip (1) and the surface of the substrate (2) (see figure 4).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to incorporate the teaching of Nakamura into the device taught by Scharr et al. because it provides good adhesion between the chip and the substrate. The combined device shows a cured adhesive polymer is situated in a middle region between the bump surface of the chip and the surface of the substrate.

Regarding claim 18, the disclosures of Scharr et al. and Nakamura are discussed as applied to claims 14 and 15 above.

Regarding claim 19, the disclosures of Scharr et al. and Nakamura are discussed as applied to claim 18 above.

Scharr et al. further teach the bump (28) material comprises gold and the interconnect points (metallization [23]) comprise Sn, and the alloy (a region indicated by line [29]) at the interface comprises an Au/Sn alloy (see figure 2; column 3, line 54 – column 4, line 16).

Art Unit: 2811

Regarding claim 20, the disclosures of Scharr et al. and Nakamura are discussed as applied to claim 19 above.

Scharr et al. and Nakamura differ from the claimed invention by not showing the alloy at the interface is a 20:80 Sn:Au alloy. It would have been obvious to one having ordinary skill in the art at the time the invention was made for an alloy at the interface is 20:80 Sn:Au alloy, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

7. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 5,346,857 to Scharr et al.

Regarding claim 17, Scharr et al. do not explicitly teach the alloy at the interface is 20:80 Sn:Au alloy. It would have been obvious to one having ordinary skill in the art at the time the invention was made for an alloy at the interface is 20:80 Sn:Au alloy, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

### ***Response to Arguments***

Applicant's arguments with respect to claims 14-17 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

Art Unit: 2811

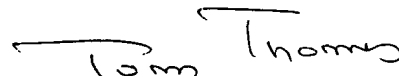
Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quang D Vu whose telephone number is 703-305-3826. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 703-308-2772. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.



**TOM THOMAS**  
**SUPERVISORY PATENT EXAMINER**  
**TECHNOLOGY CENTER 2800**

qv  
August 27, 2003